Also, the endcaps **130**, **140** may be substantially similar in composition and/or manufacture relative to one or more of the segments **110**.

[0030] The ring segments **110** and insulators **120**, and perhaps the endcaps **130**, **140** when employed, collectively define an internal volume of the apparatus **100**. The volume is substantially cylindrical, having a diameter D and a height Z. The height Z may range between about 100 μm and about 1 cm. For example, the height Z may be about 1.05 mm. However, the height Z is not limited within the scope of the present application, and may vary depending on the number and/or thickness of the ring segments **110** and/or insulators **120**.

[0031] Referring to FIG. **2**A, illustrated is a top view of at least a portion of an apparatus **200** in an intermediate stage of manufacture according to one or more aspects of the present application. One or more aspects of the apparatus **200** may be substantially similar to one or more aspects of the apparatus **100** depicted in FIG. **1**.

[0032] The apparatus **200** includes a ring segment **210** formed on or over a substrate **202**. The ring segment **210** may be substantially circular, or cylindrical, and may include one or more layers comprising doped silicon, stainless steel, aluminum, copper, nickel plated silicon or other nickel plated materials, gold, and/or other electrically conductive materials. The ring segment **210** may include one or more layers formed on or over the substrate **202** by laser etching, Liga, reactive ion etching (RIE) and other types of etching, micromachining, and/or other manufacturing processes. An internal diameter D of the ring segment **210** may be substantially similar to the diameter D depicted in FIG. **1** and described above. An external diameter of the ring segment **210** may be about 20% greater than the internal diameter D, although other ratios of the internal and external diameters are also within the scope of the present application.

[0033] While the ring segment **210** is being formed, a contact **215** may also be formed substantially planar to the ring segment **210**. Thus, for example, the contact **215** may be substantially similar in composition and/or manufacture relative to the ring segment **210**. Accordingly, the contact **215** may be integrally formed with the ring segment **210**. However, other configurations for forming and electrically connecting the contact **215** and ring segment **210** are also within the scope of the present application.

[0034] Referring to FIG. **2**B, illustrated is a top view of the apparatus **200** shown in FIG. **2**A in a subsequent stage of manufacture according to one or more aspects of the present disclosure. An insulator **218** may be formed on or over the ring segment **210** and contact **215** before subsequently forming an additional ring segment **220** and contact **225** on or over the insulator **218**. The ring segment **220** may be substantially similar to the ring segment **210**, and may be substantially coaxially aligned with the ring segment **210**. The contact **225** may be substantially similar to the contact **215**, although the contact **225** may be laterally offset from the contact **215** with respect to the substrate **202** and/or insulator **218**, such as by an offset distance d. The offset distance d may range between about 10 μm and about 2.5 mm, although other values are also within the scope of the present application.

[0035] The insulator **218** may include one or more layers comprising air, polyamide, polymer, Teflon, and/or other dielectric or non-conductive materials. The insulator **218** may be substantially similar in composition and/or manufacture to the insulators **120** shown in the embodiment depicted in FIG. **1**.

[0036] Referring to FIG. **2**C, illustrated is a top view of the apparatus **200** shown in FIG. **2**B in a subsequent stage of manufacture according to one or more aspects of the present disclosure. An insulator **228** may be formed on or over the ring segment **220** and contact **225**. The insulator **228** may be substantially similar in composition and/or manufacture to the insulator **218** shown in FIG. **2**B.

[0037] An additional ring segment **230** and contact **235** may then be formed on or over the insulator **228**. The ring segment **230** may be substantially similar to the ring segments **210**, **220**, and may be substantially coaxially aligned with the ring segments **210**, **220**. The contact **235** may be substantially similar to the contacts **215**, **225**, although the contact **235** may be laterally offset from the contacts **215**, **225** with respect to the substrate **202** and/or insulator **228**.

[0038] Referring to FIG. **2**D, illustrated is a top view of the apparatus **200** shown in FIG. **2**C in a subsequent stage of manufacture according to one or more aspects of the present disclosure. An insulator **238** may be formed on or over the ring segment **230** and contact **235**. The insulator **238** may be substantially similar in composition and/or manufacture relative to the insulators **218**, **228** shown in FIGS. **2**B, **2**C, respectively.

[0039] An additional ring segment **240** and contact **245** may then be formed on or over the insulator **238**. The ring segment **240** may be substantially similar to the ring segments **210**, **220**, **230**, and may be substantially coaxially aligned with the ring segments **210**, **220**, **230**. The contact **245** may be substantially similar to the contacts **215**, **225**, **235**, although the contact **245** may be laterally offset from the contacts **215**, **225**, **235** with respect to the substrate **202** and/or insulator **238**.

[0040] As also depicted in FIG. **2**D, the apparatus **200** may include contacts **248** each extending through one or more of the insulators **218**, **228**, **238** to corresponding ones of the contacts **215**, **225**, **235**. The contacts **248**, in conjunction with the contact **245** or a contact extending therefrom, may be utilized to electrically bias individual ones of the ring segments **210**, **220**, **230**, **240**. The insulators **218**, **228**, **238** may be configured to electrically isolate each of the ring segments **210**, **220**, **230**, **240** from each other, such that any one of the ring segments can be electrically biased individually without also inadvertently biasing any of the other ring segments.

[0041] Referring to FIG. **3**, illustrated is a schematic view of at least a portion of an apparatus **300** according to one or more aspects of the present disclosure. The apparatus **300** represents one environment in which the apparatus **100** and/or **200** described above may be implemented. For example, the apparatus **300** includes a coaxial ring ion trap **310** that may be substantially similar in composition and/or manufacture to the apparatus **100** shown in FIG. **1** and/or the apparatus **200** shown in FIG. **2**D, or may otherwise have one or more aspects in common with the apparatus **100** of FIG. **1** and/or the apparatus **200** of FIG. **2**D.

[0042] Thus, for example, the ion trap **310** includes a plurality of independently biasable and coaxially aligned ring segments **315**. One or more insulators interpose each neighboring pair of ring segments **315**, although the insulators have been omitted from FIG. **3** for the purposes of clarity. The ion trap **310** also includes endcaps **317**. The ring